

Cessna Fills Out the Citation Line



Cessna Aircraft (4)

By Richard N. Aarons

Cessna has announced four Citation projects—two new airplanes and two significantly reconfigured products.

Cessna Aircraft is betting on a solid future for the work-a-day aircraft of its Citation family, and has begun filling the gaps in the product line with four models. The list comprises the all-new Sovereign “traditional” midsize twin-jet; a much-improved Citation Ultra with new landing gear, engines and systems; a stretched CitationJet with new engines, avionics and systems; and an improved CitationJet with new avionics. All four projects were announced at October’s NBAA meeting.

A detailed report on each of the new Citations, along with performance charts, photos and engineering drawings, can be found in this special section, but here are the highlights.

Citation Sovereign is a replacement for the 1,700 traditional midsize aircraft now in service. Powered by Pratt & Whitney Canada PW306C engines, the aircraft will carry eight passengers, 2,500 nm with IFR reserves. The Sovereign has a new wing design, a fully trimmable tail, trailing-link landing gear and conventional

control linkage. Priced at \$12.5 million, customer deliveries are planned for third quarter 2002.

Citation Ultra Encore is a much-enhanced version of the Citation Ultra (nee Citation V). It has P&WC PW535A engines, trailing-link landing gear, improved systems and a redesigned panel and cabin interior. Priced at \$6.9 million, customer deliveries are planned for second quarter 2000.

Citation CJ2 is a CitationJet at heart, but a much larger, faster CitationJet. It is powered by Williams-Rolls FJ44-2C engines, and is equipped with a Collins Pro Line 21 avionics suite. Its cabin is 35 inches longer than the CitationJet’s, the tailcone is 17 inches longer, and the wingspan is 36 inches greater. Price of the Citation CJ2 is \$4.195 million (1998). First customer deliveries are set for first quarter 2001.

Citation CJ1 is a block-point change for the CitationJet. It happens at S/N 360. In addition to the new name, the CJ1 features Collins Pro Line 21 avionics and an increase in max takeoff weight for better range/payload flexibility. Customer deliveries begin in first quarter 2000. The price had not been set at this writing.

Cessna’s manufacturing specialists are making some changes at the company’s Wichita Mid-Continent Airport facility. Work will begin soon on an addition to the north end of the current manufacturing complex (W7). The expansion will permit the realignment of assembly lines in the factory. Some back-shop subassembly work will be moved out of the airport manufacturing facility to other locations around Wichita. A new paint facility for large aircraft was completed recently, and in 1999, the company will open its new interior fabrication and installation center.

Citation Sovereign

A new-technology 'traditional' midsize business jet

Today's traditional midsize business jet fleet comprises over 1,700 units—respected and dependable aircraft such as the Citation III and its derivatives, the Hawker 800s, assorted Falcons 20, various Sabreliners, the Learjet 55/60s and others. These airplanes or their predecessors appeared in the 1960s and 1970s and gradually became the foundation upon which modern executive jet transportation was built. But Cessna believes even the most recently manufactured members of this fleet are getting a bit long in the tooth, if not in years, in the technologies they incorporate. Today's engines are miles more efficient, modern avionics are generations ahead in capability, and recent aerodynamic designs are extraordinarily adaptable in dealing simultaneously with high cruise speeds and small airports.

It was with all this in mind, said Cessna Vice Chairman Gary Hay, that the company decided to reinvent the midsize executive jet and introduce a preliminary design in preparation for this year's NBAA meeting. Cessna had considered developing a super-midsize airplane to compete with the growing list of machines in that category, Hay told B/CA, "but we realized what the industry really needed was a gap filler—a replacement for the aging midsize airplanes. The replacement would do the traditional mission better using all the benefits of new aerodynamics, powerplants, avionics, materials and manufacturing technology."

Design for the new airplane—it's called the Citation Sovereign and it's expected to be designated the Model 580—began with the passenger cabin dimensions and mission requirements. The cabin will be big when compared with traditional midsize cabins, with room for double-club seating plus a forward side-facing bench. (Cessna engineers may come up with a way to certify the bench for occupancy during takeoff and landing.) At the other end of the cabin is an enclosed lavatory and bag-

gage space. The cabin has the same hoop size as the Citation Excel, but the Citation Sovereign will be five feet longer than the Excel, with an overall length of 61 feet. An external baggage compartment will provide an extra 100 cubic feet of storage space.

At this writing, Cessna's engineering and marketing teams were just beginning to pull together specifications for the airplane, but many important decisions had been made. The design mission is to fill Sovereign's eight seats and fly 2,500 nm with NBAA IFR reserves (200 nm) in ISA, zero wind conditions. The target BFL for that mission is 4,080 feet. Climb to initial cruising altitude at FL 460 should take less than 26 minutes and (going the other way) climb to FL 410 should require less than 20 minutes. Maximum certificated altitude will be 47,000 feet. Maximum cruise will be 444 KTAS: Typical cruise will be 430 knots (0.75 Mach) at FL 410. MMO is 0.80. Landing distance should be under 3,200 feet at all weights below max landing. The Sovereign will have a max takeoff weight less than 30,000 pounds. Its design max payload is 2,500 pounds; design full-fuel payload is 1,600 pounds.

The Sovereign wing is an entirely new design with a 17.1-degree leading edge sweep, a mild 12.5-degree quarter-chord sweep and a straight trailing edge. It spans 63.13 feet and will incorporate bleed air anti-ice.

"We thought it was time to design a new wing to carry on the tradition of the



Cessna Aircraft (2)

Cessna's new Sovereign has a super-critical airfoil.

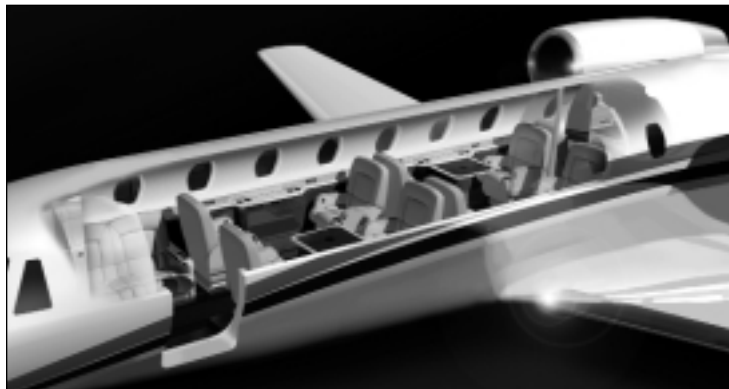
earlier 500-series Citations [in terms of the straight-wing benefits] while delivering better speed performance," said Milt Sills, senior vice president engineering. "With the larger airplane, we need considerably more wing area in order to accomplish the cruise mission, to carry the fuel we need, and to drive down the field lengths so Sovereign operators can use pretty much the same fields that they use today with their Citations. Of course they might not carry a full load of fuel for those missions, but they'll still have field lengths down in the 3,500- to 4,000-foot range."

The Sovereign wing has a supercritical airfoil, and "it incorporates all the knowledge we've accumulated from the original Citation III," Sills said. "We've done a lot of tunnel work with various specifications of camber and thickness, and we have adjusted the sweep here and there. We added the sweep because we wanted to get a wing that would cruise more efficiently in the 0.75 Mach range." The wing is large—with a 63-foot span—and will deliver a "Citation feel" with relatively low wing loading.

"We want to maintain a simplicity in the systems design," said Sills, "so we've done a lot of work on the flight controls." The conventional ailerons (assisted by roll spoilers) and the rudder will be manually operated. The airplane will

have an infinitely variable horizontal stabilizer. Sovereign engineers decided on a trimmable horizontal stabilizer to provide a broader c.g. range for the long cabin, and to give the elevator enough power to rotate the aircraft at the relatively low speeds associated with small airport operations.

Fully modulated spoilers, flaps and trailing-link landing gear will be operated by a 3,000-psi hydraulic system. An APU



The Sovereign's cabin will be large when compared with traditional midsize cabins, with room for double-club seating, plus a forward side-facing bench.

will be standard. Bleed air will be used for surface anti-ice, and the windshield will be electrically heated. Single-point refueling will be standard on the Sovereign, and the fuel system will incorporate heaters so anti-icing additives will not be necessary. The 28-volt, split bus electrical system will be similar to the electrical systems in other Citations.

A vendor for the Sovereign's avionics has not been selected, but the configuration includes four eight-by-10-inch flat-panel displays—outboard PFDs and inboard MFDs. Engine instrumentation will be displayed on one of the MFDs with navigation information on the other. The standard equipment list will include dual FMS, dual AHRS, dual VHF nav and comm, single high-frequency com and two radio management units. RVSM group certification will be standard. Avionics options include CVR and FDR, TCAS II, GPWS or

Cessna aims to replace 1,700 existing midsize aircraft with this new entry.

EGPWS, ELT, AFIS and SELCAL.

The Sovereign will be powered by Pratt & Whitney Canada PW306C engines rated at 5,686 pounds-thrust each and flat-rated to ISA+15°C. The engine has a bypass ratio of 4.3 to one. Its new technologies include integrally bladed rotors and forced exhaust mixer. The airplane will be equipped with dual FADECs. Some 250 of these engines

will be in airline service on the Dornier 328Jet before the first Sovereign delivery. Initial TBO is 6,000 hours; hot section interval is 3,000 hours.

Citation marketers currently are defining the airplane's performance by citing target city pairs using Boeing (85 percentile) winds. "Most day" operations should be possible with the Sovereign between pairs such as Boston-Houston, Palwaukee-Van Nuys, Detroit-Los Angeles, Charlotte-Los Angeles, Charlotte-San Francisco and Teterboro-Santa Monica.

Cessna expects to win FAA certification for the Sovereign in second quarter 2002. JAA certification should follow within a year. Customer deliveries are scheduled for third quarter 2002.

Pricing is not firm, but the airplane is expected to cost about \$12.5 million with complete interior, EGPWS and TCAS II. ■

Citation Ultra Encore

The third-generation Model 560 has new power, landing gear and systems.



Cessna Aircraft

Cessna's Model 560 Citation joined the business fleet in 1989 as the Citation V. It was, according to its marketers, "the light jet with the fewest compromises." Customers seemed to agree; some 260 units were sold between its introduction and 1995, when an improved version—the Citation Ultra—rolled off the lines. The Ultra featured more powerful P&WC JT-15D powerplants, more capable avionics and updated systems and structures.

The Ultra continues to be popular, and over 270 of them will have joined the fleet by second quarter 2000 when, once again, the airplane will be reborn with a new name and another set of improvements. The metamorphosis occurs at S/N 539.

The newest Model 560 is the Citation Ultra Encore. The changes that define the Encore include new trailing-link main landing gear and an improved brake system, new P&WC

PW535A powerplants, bleed-air wing anti-ice, an electronic pressurization controller, a new electrical J-box and a redesigned instrument panel layout. The Encore also has new interior furnishings designed for maintainability as well as livability.

The change that will be most appreciated by current Model 560 owners is the new main gear design. As popular as the 560s have been, most operators find their airplanes stiff-legged and uncooperative

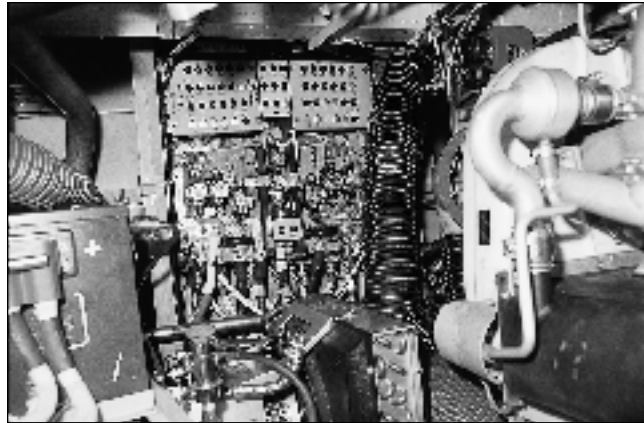
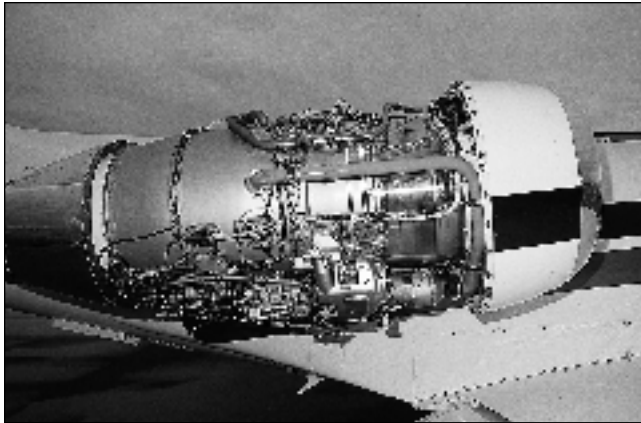
in the landing mode. The trailing-link main landing gear should fix that. Also the stance between the main landing gears is narrower so ground handling will be better, especially in crosswinds. An improved braking system eliminates individual master cylinders behind each pedal in favor of mechanical linkages to the brake hydraulic fluid metering valves. This design reduces the parts count in the system, but, more importantly, gives the pilot better feel and more subtle control of the brakes. The grabbiness common in earlier Model 560 brake systems has been eliminated in the Encore.

Adding the trailing-link gear ate up wing volume that had been used for fuel in earlier Model 560s. Replacing the Ultra's pneumatic boots with bleed-air wing anti-ice also consumed tank volume. So, the Encore fuel tanks ended up with less capacity than the tanks of its predecessors—516 pounds less to be exact. This could have



Paul Bowen

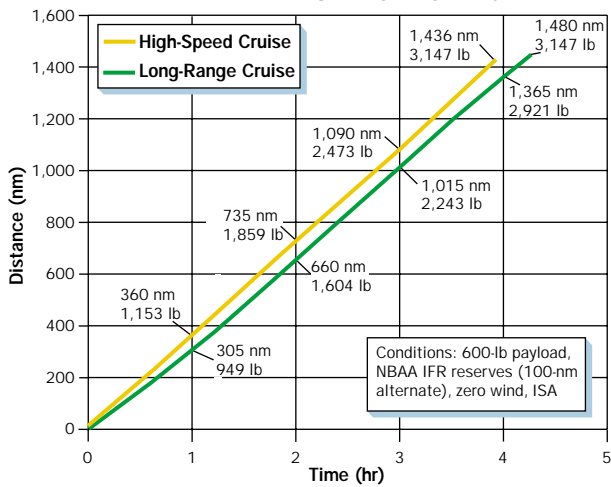
No more pneumatic boots for the Encore; they have been replaced by bleed-air heated leading edges.



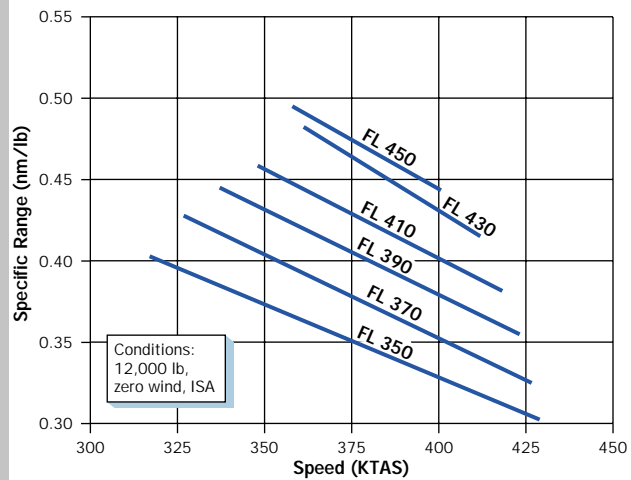
The Encore will be powered by Pratt & Whitney PW525A engines producing 3,360 pounds of thrust at 80° F. These engines offer a 15-percent SFC improvement over the JT15D-5Ds used on the Ultra. Cessna decided on hydromechanical fuel controllers for dispatch reliability. Fuel heaters in the system eliminate the need for additives such as Prist. The new electrical junction box (right) offers improved maintenance over J-boxes in earlier models. Relays are bolted in place (rather than welded) and can be accessed without dismantling the entire assembly. Breakers are mounted on the front of the panel and are visible from the bay door.

CITATION ULTRA ENCORE

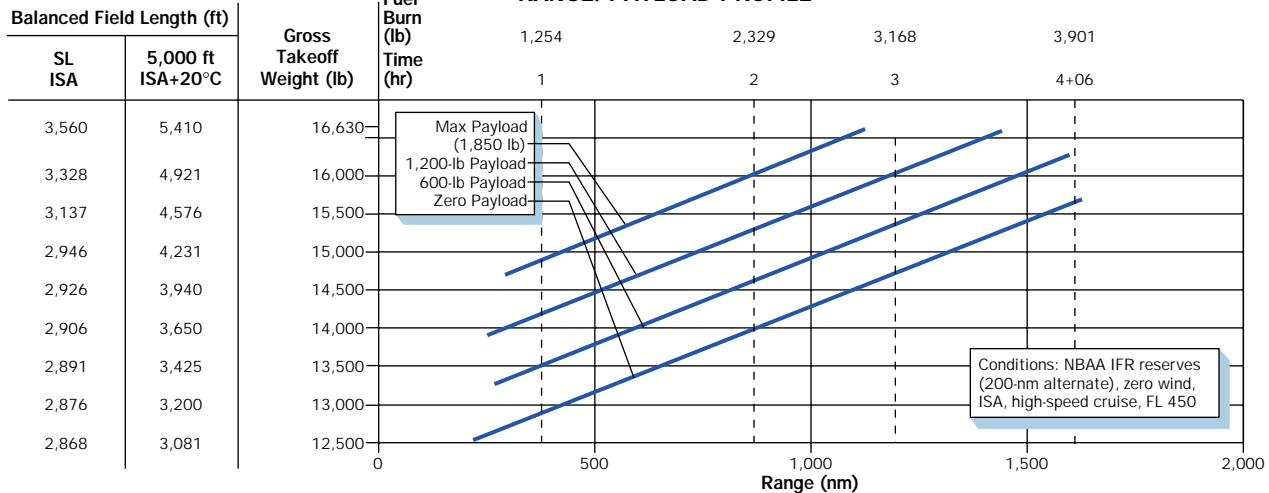
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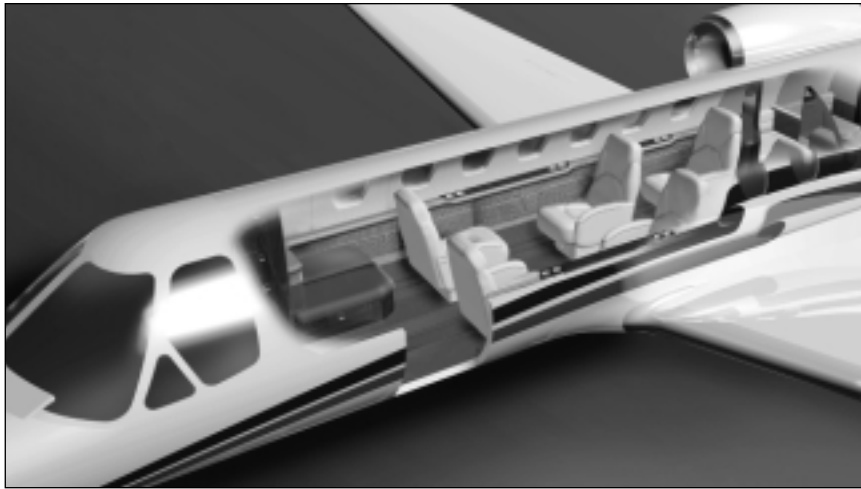
SPECIFIC RANGE



RANGE/PAYLOAD PROFILE



Data Source: Cessna



Cessna Aircraft

The Encore interior is all new. Seat rails have been removed except for those directly under the forward-facing club seats to improve floor appearance and comfort.

been bad news for the design, but the new engines with their improved specific fuel consumption came to the rescue.

The Encore's PW535A powerplants produce 3,360 pounds of thrust at 80°F, and provide a 15 percent SFC improvement and a 10 percent thrust improvement over the 3,045-pound-thrust JT15D-5Ds used on the Ultra. (The JT15Ds used on the original Citation V were rated at 2,900 pounds.) The improved specifics not only make up for the lost fuel capacity, but actually give the airplane an extra 35 nm of range on comparable missions.

The Encore's zero-wind NBAA IFR range with four passengers is 1,651 nm. It retains the Ultra's good field perfor-



Paul Bowen

The Encore's new main gear should provide softer touchdowns, and the narrower track is expected to make ground handling easier.

mance—3,561-foot BFL at MTOW in SL ISA conditions. It is a quick climber—18 minutes to FL 390, 24 minutes to FL 430 and 31 minutes to FL 450. And, it has solid cruise speeds—425 KTAS at FL 390, 419 KTAS at FL 430 and 406 KTAS at FL 450. (See the accompanying performance charts.)

Cessna has opted for hydromechanical fuel controllers rather than electronic fuel controllers in order to keep dispatch reliability high and costs relatively low. The engine fuel system is equipped with heaters, so anti-icing additives will not be required. Nordam thrust reversers are standard. Initial TBO is 5,000 hours, and the hot section interval is 2,500 hours. All P&WC Eagle Service Plan (ESP) programs are available as is Cessna's Power Advantage program.

Honeywell Primus 1000 avionics continues as standard; however, there are some changes. The dual independent flight directors on previous Model 560s have been replaced by a single FD computer and mode selector serving both sides. This was done to simplify the presentations. Primus II communications radios with 8.33 kHz spacing are standard. Formerly, Collins was standard for VHF nav and comm, while the Honeywell units were optional. The AlliedSignal GNS-XL FMS is standard as is RVSM group certification.

The annunciator panel has been relocated to a position under the center glareshield, and a new fuel temperature/OAT gauge monitors fuel heater performance. The electronic pressurization controller similar to that used on the Citation Bravo and the CitationJet has been added to the Encore's standard-equipment list.

Citation Ultra Encore Preliminary Weights (lb/kg)

Max Ramp	16,830/7,633
Max Takeoff	16,630/7,542
Max Landing	15,200/6,893
Max Zero Fuel	12,000/5,442
Typical BOW	10,532/4,776
Max Fuel	5,298/2,403
Full Fuel Payload	1,000/454

Source: Cessna

The Encore interior is all new, too. The seats have been certificated to 16-g requirements, and have been redesigned with a single control lever for passenger convenience. Seat rails have been removed except those directly under the forward-facing club seats to improve floor appearance and comfort. New overheads, similar to those used in the Bravo, provide one inch more headroom and improved air distribution. Also, the refreshment center storage compartments have been redesigned. Maintainability features have been added to the interior, including pin-installed furniture and new window reveals. Both these changes provide for easier removal and installation, and they reduce the probability of damage during maintenance.

It was, according to its marketers, "the light jet with the fewest compromises."

Maintainability on the mechanical side has been improved too. The electrical junction box has been redesigned so relays can be removed without dismantling the assembly. Also, personnel can check circuit breakers without climbing into the tail utility compartment.

The prototype Encore began flying in July. Certification is expected in fourth quarter 1999, with first customer deliveries in second quarter 2000.

Price of the Encore is \$6.875 million (2000 dollars). The airframe and standard avionics are warranted for five years with no hourly limits. Optional avionics have a two-year warranty. The engines carry a five-year/2,500-hour warranty. Paint, interior and vendor items are warranted for one year. ■

New Citation CJ1 and CJ2

The CitationJet gets a remake and a big brother.

Operators, flightcrews and air traffic controllers started calling Cessna's CitationJet the "CJ" shortly after the entry level business jet entered service in 1993. The folks at Cessna never objected, because the name seemed to fit the personality of the airplane. Besides, the CJ was the most successful introduction in Cessna history, with 50 orders signed on the day the program was announced. Owners could call it anything they wanted. Demand for the CJ continues to better Cessna's expectations, and by spring 2000 there will be 359 of them in the field.

Serial number 360, however, will be different from its predecessors. The "CJ" appellation will become official and the aircraft will be designated the Citation CJ1. But more important is the fact that this upgraded CitationJet will have a new Collins Pro Line 21 avionics suite, a new weight schedule and more payload/range flexibility. Details of this CJ1 block point change can be found at the end of this story, in the avionics sidebar and the accompanying performance charts.

One year after the owners take delivery of the first Citation CJ1s, a larger, faster Citation CJ2 will join the fleet. This airplane already is beating its older sibling in one area. The Citation CJ2 had posted some 70 firm orders before the design was announced publicly, these from CitationJet owners who were given a pre-NBAA sneak preview.

The CJ2 design process began with a wish list created by CitationJet operators. They wanted higher cruise speeds, more cabin room, greater range and latest technology avionics. The company had a wish list too. Cessna management wanted an airplane that could meet competitors head-on—especially the high-end turboprops—in terms of cabin space and payload/range flexibility.

Of course, CitationJet operators have a list of things they like about their airplanes—its modern technology, for example, simple systems, low maintenance requirements, good operating economics—and those things had to be preserved.

To make a Citation CJ2, Cessna engineers started with a CitationJet, stretched the fuselage by 35 inches and the tailcone by 17 inches, increased the wingspan by 36 inches and added a larger, swept horizontal tail. Next they installed a pair of Williams-Rolls FJ44-2C engines and Collins Pro Line 21 avionics. The larger, natural laminar flow wing will accommodate 4,000 pounds of fuel, so the engineers had to come up with modifications to provide faster fuel fill rates. The big wing—its area is 10 percent larger—also widens the wheel tread by three feet. The CJ2 also has an improved hydraulic pump that runs at lower speed with better reliability,

and a redesigned J-box located aft of the baggage compartment for improved access.

The CJ2 will have a better environmental system providing 33 percent greater cabin cooling capacity. A larger forward evaporator does the trick. The airplane will be certificated to FL 450, and its 8.9-psi cabin pressure differential will hold a sea-level cabin to 23,586 feet.

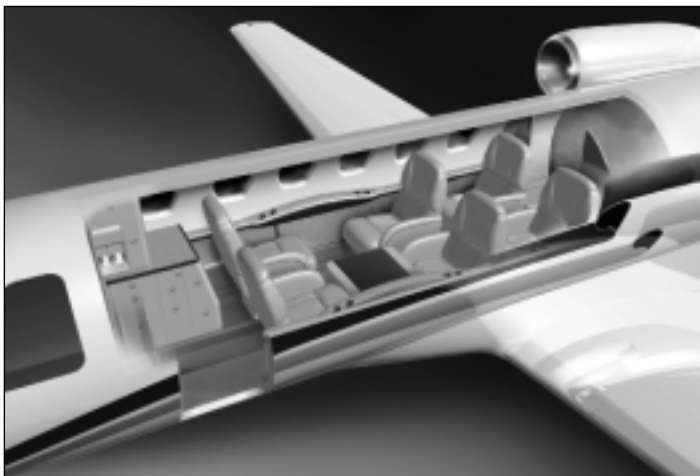
Cessna expanded the optional equipment list for the CJ2. It includes vapor-cycle air conditioning, engine synchronization and dual Scott EROS quick-donning crew oxygen masks.

Gary Hay, Cessna vice chairman, told B/CA the Rockwell Collins Pro Line 21 system was selected to anchor the CJ2 (and CJ1) flightdeck because Cessna "wanted to use advanced technology . . . to provide market-leading value, to simplify the man-machine interface, to minimize



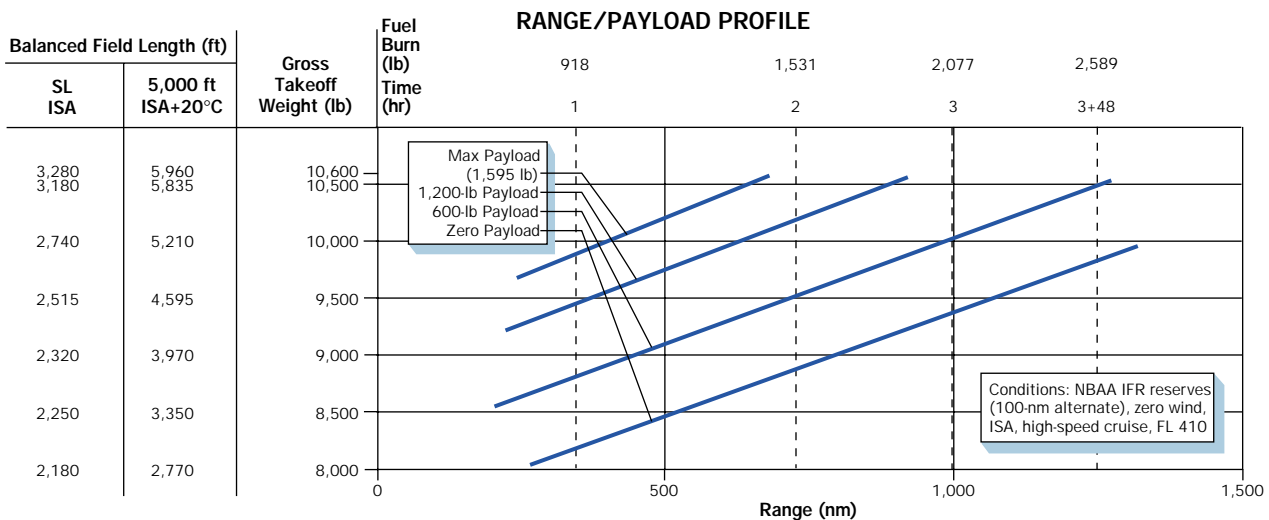
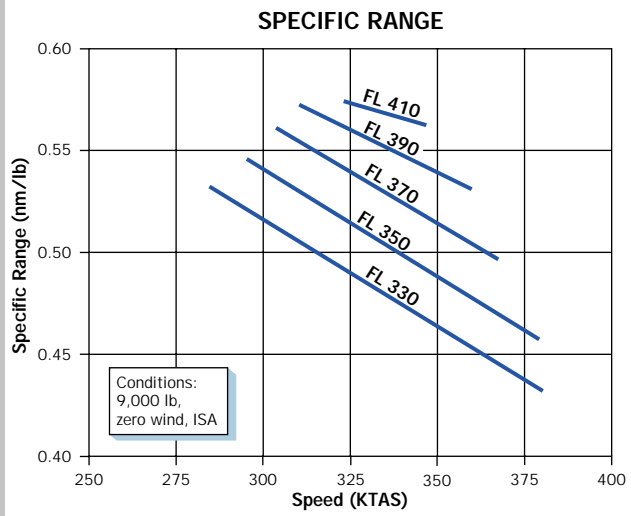
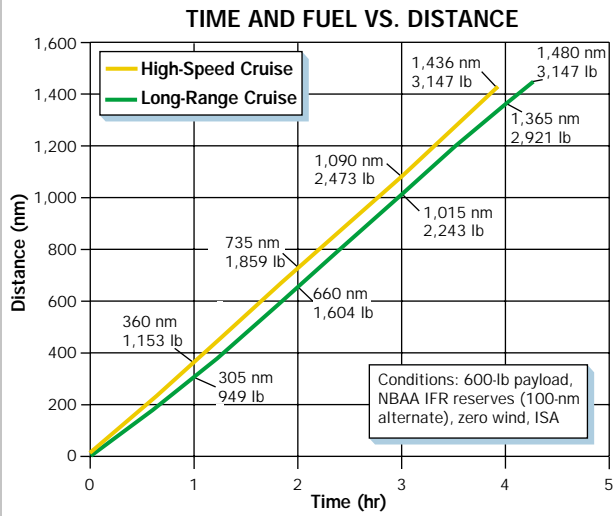
Cessna Aircraft (3)

The new Citation CJ1 (top) and the CJ2 will have a Collins Pro Line 21 avionics suite and more payload/range flexibility.



The CJ2's interior stretch went to both the passengers and pilots. Cabin layout features a forward club and two aft forward-facing seats.

CITATION CJ1



Data Source: Cessna Aircraft

weight, power requirements and volume, and to plan for future growth.” Cost was a big factor too. (See avionics sidebar.)

The CJ2’s interior stretch went to both the passengers and pilots. The flightdeck has been extended aft two inches, giving the pilots more living space and storage area. Some 33 inches of the cabin stretch went into the passenger area, and the airplane is fitted with a Bravo-style overhead that provides more room directly above a seated passenger. The right-hand forward refreshment center has been enlarged, and a left-hand unit is available as an option.

Cabin layout features a forward club and two aft forward-facing seats. A non-belted, non-flushing toilet is standard. It’s located aft of dual divider panels. A flush-

ing unit is optional as are electrical outlets. Other cabin options include CD stereo, executive leaf tables and a trip-information display.

The tailcone stretch creates a 50.0-cubic-foot baggage compartment with a 600-pound limit and room for 210 cm skis. The 4.3-cubic-foot cabin area can accommodate 100 pounds of inflight-accessible baggage, and the 20.4-cubic-foot nose compartment can handle 400 pounds of baggage.

The FJ442C delivers 2,300 pounds of thrust at 72 degrees, compared with the 1,900 pounds of thrust generated by the CJ1’s FJ44-1A. The CJ2 installation will use hydromechanical fuel controllers. TBO is 3,500 hours.

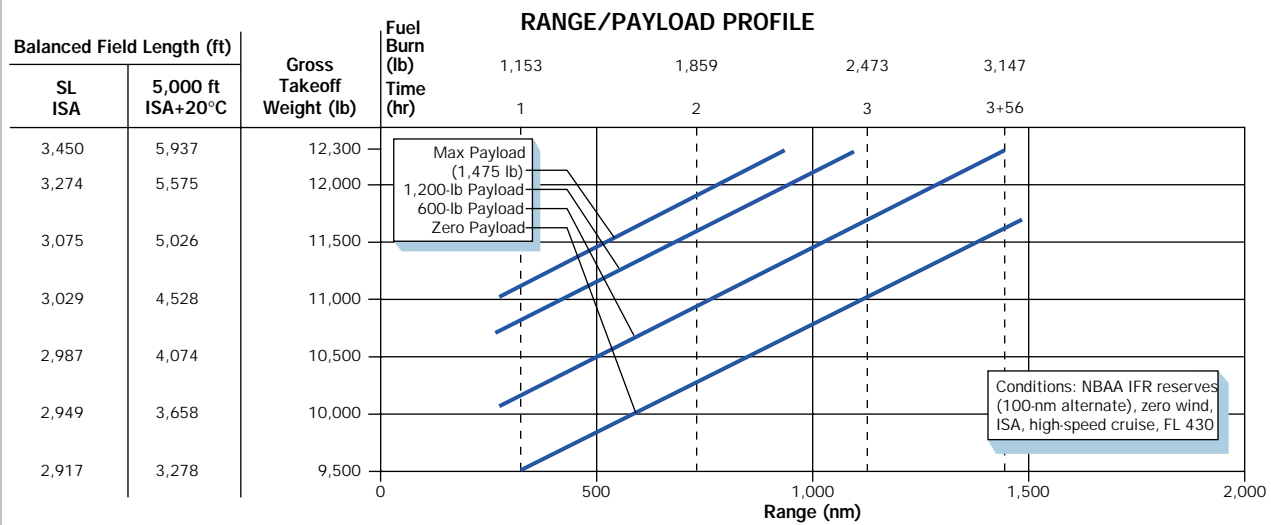
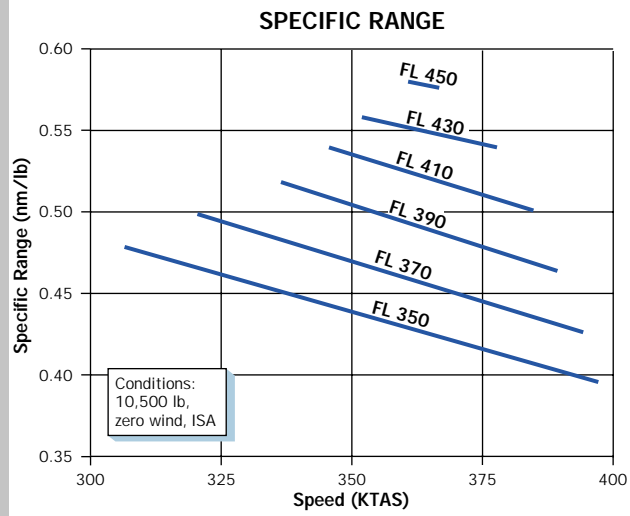
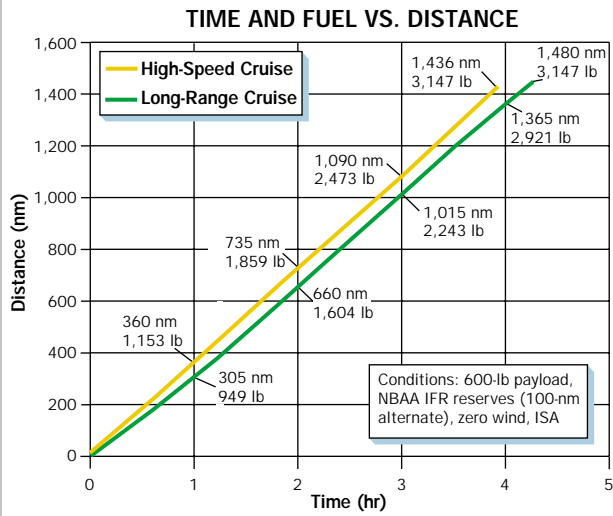
The CJ2’s standard day takeoff distance

(SL ISA MTOW) will be 3,450 feet; landing distance less than 3,200 feet. Typical cruise speeds will be in the 370 to 400 KTAS range. Mmo is 0.72 KCAS. (See the accompanying table for comparative weight buildups.)

Comparing max cruise speeds and mid-cruise weights, the CJ2 will be about 400 KTAS at FL 310 (20 KTAS faster than the CitationJet) and 380 KTAS at FL 410 (38 KTAS faster than the CitationJet.) The CJ2’s high-speed cruise fuel efficiency is better too. For example, the CJ2 delivers 377 KTAS at FL 430, burning 700 pounds of fuel. A similar fuel flow in the CitationJet delivers 362 KTAS at FL 380. See the accompanying charts for airport/payload/range performance.

Price of the Citation CJ2 is \$4.195 mil-

CITATION CJ2



Data Source: Cessna

lion (1998). The CJ2 project has been underway at Wichita and Cedar Rapids (for avionics certification) since May. The prototype is expected to fly in April 1999. Certification is scheduled for May 2000 with first demonstrators available in fourth quarter 2000 and first customer delivery in first quarter 2001.

Citation CJ1

The Citation CJ1 is a block point change at S/N 525-0360. At this writing some 281 CitationJets had been delivered; 80 are on the order books, leaving just 15 units to be sold before the block point change.

The major element of the block point change is the switch to Collins Pro Line 21 avionics (see sidebar) and a 200-pound increase in MTOW. (The weight box tells

the story.) Optional avionics include the Universal UNS-1K or Global GNS-XLS FMS, an RVSM certification kit, a CVR, a collision avoidance system and a terrain avoidance system (vendors to be decided).

As was the case with the CJ2, customer input drove the changes that appear in

the CJ1. The goals were to employ the latest technology, increase the airplane's utility and maintain its price as the most affordable business jet on the market.

The increase in gross weight is split between the avionics and the payload. Cessna points out that with more than

Citation CJ Weight Comparison (lb/kg)

	CitationJet	CJ1	CJ2
Max Ramp	10,500/4,762	10,700/4,853	12,425/5,635
Max Takeoff	10,400/4,717	10,600/4,807	12,300/5,578
Max Landing	9,700/4,399	9,800/4,444	11,500/5,215
Max Zero Fuel	8,000/3,628	8,400/3,810	9,300/4,218
BOW (Single-Pilot)	6,750/3,061	6,800/3,084	7,825/3,549
Max Fuel	3,220/1,460	3,220/1,460	4,000/1,814
Full Fuel Payload	SP+530/240	SP+680/308	SP+600/272

three passengers on board, the CJ1 provides "nearly 100 nm greater range than the CitationJet." The cost of this range benefit is only an additional 200 feet in BFL—3,280 feet for the CJ1 compared with 3,080 for the CitationJet.

Basic performance is similar to that of the CitationJet, with a max cruise speed

of 380 KTAS, a certificated ceiling of 41,000 feet, and an IFR range of 1,100 nm with four passengers.

Price of the CJ1 had not been set at this writing. The airframe and Collins avionics carry a five-year warranty on parts and labor. The engines have parts and labor warranty for two years or

1,000 hours. Optional avionics are warranted for two years, and vendor items, paint and interior carry one-year warranties.

The Citation CJ1 project got under way in May. The prototype is scheduled to fly in April 1999. FAA type certification is expected in May 2000. B/CA

Collins Pro Line 21 EFIS, AFCS and AHRS Selected for CJs

Pilots of the CJ1 and CJ2 will work behind an array of Rockwell Collins Pro Line 21 EFIS displays. The Cedar Rapids, Iowa company also provides the CJs' dual attitude heading reference systems (AHRS); digital, dual-channel, automatic flight control system (AFCS); a single, solid-state, digital air-data computer; and the RTA-800 solid-state, stabilized, x-band color weather radar. AlliedSignal (Bendix/King) manufactures the CJs' panel-mount CNI-5000 VHF navigation and communication radios—comms have 8.33 kHz spacing—transponder, marker and ADF. The AlliedSignal KLN-900 GPS also is standard.

Selecting Collins to provide the CJs' flight control and EFIS displays represents a major vendor change for Cessna.

Previously the company had selected Honeywell displays, flight directors and autopilots for the CitationJet and other members of the Citation family. Gary Hay, Cessna's vice chairman, told B/CA that Cessna chose Collins over Honeywell for this application "entirely on price and performance" and that in the future, Cessna "will continue to make avionics decisions on an airplane-by-airplane basis." Cessna believes the Pro Line 21 "man-machine interface" is ideal for single-pilot flying in that its operation is intuitive, the display formats are easy to interpret, format control is menu-driven, and the eight-by-10-inch panels reduce scan.

The CJ1 and CJ2 instrument and avionics panels are identical. The standard system includes two eight-by-10-inch active-matrix color LCD displays.

The primary flight display (PFD), positioned in front of the left pilot seat, provides representations of an ADI and HSI, along with moving tapes for airspeed and altitude. The PFD also displays vertical speed, radar altitude, V-speed bugs, autopilot/flight director modes, and vertical navigation selections.



Autopilot/flight director mode selection buttons are mounted above the PFD. Controls for the EFIS displays include bezel-mounted push buttons and a course/heading selector panel mounted to the right of the PFD. The navigation information section of the PFD can show a traditional HSI rose, or an arc with weather, navigation and TCAS overlays. The PFD provides reversionary functions for the MFD.

The MFD, mounted in the center panel, provides a full-time display of engine and fuel-system parameters (top half) and a rich collection of navigation information (bottom). The full-time engine/fuel indications include vertical tapes showing N1, ITT, oil pressure oil temperature and fuel

quantity. Digital displays show N2 and fuel flow. The bottom of the MFD shows several map formats including a planning map for crew briefing, and overlays of radar, TCAS and routes. The MFD provides reversionary functions for the PFD. Cessna selected an electromechanical altimeter and IVSI for the right side panel along with individual LCD ADI and HSI indicators.

The Pro Line 21 is a highly integrated, modular, system that uses the latest digital techniques in order to place maximum capability into a low-cube, lightweight package. The AHRS-3000 sensors, for example, incorporate solid-state digital quartz gyros (DQGs) developed by Systron Donner. The DQG is about the size of a (square) egg and has an estimated MTBF of 10,000 hours. The DQG is combined with tiny accelerometers and is packaged in an LRU one-third smaller than earlier solid-state AHRS systems.

The CJ avionics suites are complete for most domestic operations; however, options are available including a second ADF and a second DME for the AlliedSignal CNI 5000 suite. The standard KLN-900 pedestal-mount GPS can be exchanged for an Allied Signal (Global) GNS-XLS or Universal Avionics UNS-1K. High frequency communication is available (AlliedSignal KHF-950), as are an L-3 Communications cockpit voice recorder and various Fairchild flight data recorders. A collision avoidance system (CAS) and a terrain avoidance system (TAS) will be added to the options list later. Prices for these exchanges and the options had not been established at this writing.